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THE ENTOPATH NEWS.
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INTRODUCTORY

This issue contains a summary of the reports sent in answer to questionnaires on squirrel damage. The fact that answers were received from 551 forest units is a striking testimony to the interest shown in this form of damage. Much valuable data has been collected in the last few years due to the co-operation of foresters in this respect and it is hoped that the response is equally satisfactory next year.

Also in this issue we have tried to make clear our ideas concerning Lophodermium damage in forest nurseries. This is in response to the large number of queries on this subject received at the beginning of the year. Most of the correspondents requested a control measure to be applied then. The note on Lophodermium is intended to show why this is impracticable and why in such cases the ruling factor was continued health of the 1957 needles.

SQUIRREL DAMAGE.

In the issue of April 1956 we described some of the damage caused by grey squirrels to trees on Commission land during 1954 and 1955. We have now analysed reports, sent to us by foresters and assistant foresters from 551 forest units, about damage observed during Forest Year 1956.

Grey squirrels were said to be scarce in 211 units, and numerous in 18. Where the abundance of grey squirrels in 1956 was compared with that observed in 1955, 122 out of 140 units were said to have less present.

Damage was reported from 45 forest areas; in only one case was the damage described as severe (Tintern, Mon.); 36 forests which suffered damage in 1955 recorded no damage in 1956.

The number of forests reporting damage to various tree species was as follows:-

Sycamore	22
Beech	21
Birch	4
Scots pine	4
Oak	3
Ash	3
Elm	2
Maple, alder, hazel and Japanese larch	1 each.

The three cases of damage to oak again came from the southwest; one from Dymock (Glos.), one from Bruton (Som.), and one from Tintern (Mon.).

Damage to Scots pine was reported from three forests where red squirrels were said to be absent (Ingleby, Cockshoot, and Llanover) and also from Crychan, where red squirrels were present but scarce. Trees were attacked when between 18 - 30 years of age, bark being stripped from the upper main stems. Damage by red squirrels is typically of this nature.

Red squirrels were scarce in 236 forest units, and numerous in 35; they caused light damage in 11 units and severe damage in 2. The units affected were all in England (E), Wales (S) or Scotland.

Once again our thanks are due to all those foresters who sent in clear and detailed information. We are looking forward to reading their reports for 1957.

THE HOUSE LONGHORN BEETLE (HYLOTRUPES BAJULUS).

Does this insect breed in dead or dying branches and stems of conifers in this country? Nobody seems to know, but the Entomology Section at the Forest Products Research Laboratory is anxious to find out.

This is one of the few longhorn beetles, in fact the only one in the United Kingdom, that can cause serious structural damage to softwood timbers in buildings. At present it is an important timber pest in parts of Surrey. Recently introduced to South Africa from Europe where it is more or less widespread, it is causing extensive damage to buildings in the Cape Province and is reported there to have become established in the dead and dying parts of native pines. A search for the insect in this country in derelict coniferous woodlands or in isolated trees, particularly in the Bagshot-Camberley-Aldershot area and around Esher and Weybridge may reveal its presence.

The flight period of the beetle is from July to September. About one inch in length, it is brownish-black in colour but has two bands of grey hairs on each wing cover and two distinct smooth black prominences on the thorax. These characteristics make it easily recognisable from the numerous other longhorn beetles found in British woodlands.

The larva is of the typical longhorn type, straight bodied, white and fleshy, about 1¼ in. long when fully grown. Attacked wood is reduced to powder, but such a condition is often concealed beneath a thin skin of sound wood.

Any information that can be supplied to help in detecting the presence of this insect, or on the location of woodland, especially derelict coniferous plantations or trees in the southern counties, worthy of further examination would be welcomed by the Entomology Section, F.P.R.L., Princes Risborough, Aylesbury, Bucks. Copies of F.P.R.L. Leaflet No. 14 on this insect are available from the Laboratory.

BACTERIAL CANKER OF CHERRY.

Since 1954 reports have been received of bacterial canker on cherry from areas in the south. These have concerned mainly P. avium - the gean, but one case has occurred on P. padus - the bird cherry. Bacterial canker is a disease well-known in the horticultural world but less familiar in forestry. A brief description of the life cycle and control measures may therefore be useful.

The causal agent is the bacterium - Pseudomonas mors-prunorum Wormald. Infection of stems and branches takes place via wounds such as leaf traces in autumn. The organism attacks the bark causing sunken patches and cankers, which are visible with the recommencement of growth next spring. Often affected trees show gumming at the affected part. Young stems and branches may be completely girdled so that the part above dies back to the canker. In early summer the bacteria migrate to the leaves where infection first results in small watersoaked spots which later turn brown and fall out giving a typical 'shot hole' effect. At this stage no bacteria are present in the wood of stems and branches so that any particular canker or lesion lasts for only one season. In autumn, the bacteria are washed from the leaves and infection of stems and branches again occurs.

It has been shown that leaf traces are the main avenues for the autumn infections but it is considered that other wounds can be invaded also. For this reason it is unwise to prune or cut cherries but if this has to be done it should be carried out at the beginning of the season.

In some areas trees showing dieback have been felled and burned in an effort to prevent spread of the disease to nearby trees. While this is probably of some value in reducing the amount of inoculum it is unlikely to be completely successful as there is almost certain to be infection producing less spectacular effects on adjacent trees.

The East Malling Research Station however, have worked on the control of this disease and we are indebted to the Station for the following recommendations.

Spraying schedule:-

End of August - Bordeaux mixture 4 - 6 - 100

(4 lbs. $CuSO_4$, 6 lbs. $Ca(OH)_2$, 100 gallons water)

End of September - Bordeaux mixture - 6 - 9 - 100

The spraying is designed to kill a large proportion of the bacteria on the leaves before invasion of the branches and stems can occur. The second spray may cause some browning of foliage but this is unimportant late in the year. Good coverage of both sides of the leaves is important.

It is seldom, due to economic reasons, that spraying of forest trees is recommended but where early symptoms of this disease are recognised the above treatment seems worthwhile. The cost of treating a limited number of small cherries planted for amenity value would be low compared with that of their re-establishment.

CUTWORMS.

Nursery foresters, and others, are troubled by many things, among them being an insect called the "cutworm". Its numbers vary considerably from year to year depending normally to a large degree on climatic conditions. 1955 and '56 were years of larger populations of these pests and, as this issue reaches you, at the beginning of their annual life cycle we give you a few notes about them.

The term "cutworm" is used to describe the larval stage of a number of moths (mainly night flyers) belonging to the Noctuid family. These larvae, all very much alike, are plump, smooth, in dull browns, greys and greens with various indefinite markings. They all have 3 pairs of legs near the head (thoracic), 4 pairs in the middle (prolegs) and one pair of claspers at the rear. The dark brown head has biting mouthparts.

The main species which occur in our nurseries are Agrotis segetum Schf. (Turnip Moth); Agrotis exclamationis L. (Heart and Dart Moth) and Tryphaena pronuba L. (Yellow Underwing). The

The adults of these moths are on the wing mainly during June and July and lay their eggs in large numbers on low leaves and other parts of weeds or plants. About a fortnight later these eggs hatch and tiny caterpillars emerge and start feeding; growth is rapid and damage in current seedbeds can be observed as early as mid-July.

Actual feeding is done chiefly below the soil. The larva cuts off a piece of foliage or a whole seedling above ground level during the night and drags it down a nearby hole where it proceeds to feed. This hole is used regularly and becomes packed with greenish excreta. The feeding part of the hole is from 1 - 3 inches below the surface.

A few of the larvae feed up rapidly and pupate during August; adults emerge from these in September, mate and lay more eggs which hatch and reinforce the remaining original larvae which are still feeding. The fully fed larvae then hibernate for the winter in earthen cells, changing into pupae during early Spring. From these come the adult males and females which start off their new generation by egg-laying on your seedbeds.

Damage by cutworms to nursery seedbeds, especially of spruce can be severe. Losses of 50% or more of the seedlings on a seedbed have been recorded. Patches of seedbeds where the number of seedlings is low and having one or more holes about 3/16 inch diameter in the soil near the middle, perhaps with a tuft of foliage protruding, are characteristic of damage by cutworm. Disturbance of grit reveals numbers of 'stumps' of seedlings which have been cut off at ground level.

Fortunately, we can now recommend a means of controlling cutworms which is easy to apply on a large scale, is not too expensive, and does not involve much preparation. Either of the insecticides Aldrin or Dieldrin (marketed as Aldrex 30 and Dieldrex 15 by Shell Chemicals) can be applied at the rate of half a gallon per acre in 100 gallons of water per acre (1/12th pint of insecticide in one gallon of water per 100 square yards). The insecticide could well be applied to seedbeds using a tractor mounted sprayer. Nursery crops are not damaged by this spray. The insecticide can be applied at the time damage is first observed, or, if attack has been serious in previous years and another is expected, an application can be made at anytime from mid-June onwards.

It is intended to publish a F.C. leaflet on this subject.

LOPHODERMIUM ON PINES.

One of the outstanding features of the minor queries received by the pathological section this year was the preponderance of cases of Lophodermium. These were reported during the winter of 1956 and early spring of 1957 and occurred mainly on nursery and young planted stock. In many cases defoliation was complete. Many of the specimens were accompanied by requests for control measures.

In some countries on the Continent, Lophodermium is much more serious than in Britain. In these countries Lophodermium attacks occur each year on nursery stock and routine protective sprayings against it are made. Lime sulphur and Bordeaux mixture are the fungicides chiefly used and are applied at intervals from July onwards sometimes to the end of September. This is supposed to cover the main infection period of Lophodermium - infection coming from ascospores from fallen needles on the ground. In Britain, heavy defoliation by Lophodermium in nurseries is the exception rather than the rule. Thus in the majority of seasons, routine protective sprays - that is, sprays applied to apparently healthy foliage to forestall infection - would serve no purpose. Routine protective spraying might have an application in an individual nursery where due to certain site factors Lophodermium attacks occurred regularly each year but such a case would be exceptional in Britain.

There is no information available on the effect of eradicative spraying on Lophodermium. Such a spray, in contrast to the protective sprays discussed above, is designed to kill a fungus in its early stages of development in the host tissues. A spray treatment of this type applied at the first sign of Lophodermium would be much more relevant to British conditions than the protective type. Unfortunately by the time reports of Lophodermium are received from nurseries it is generally too late to carry out treatment. The majority of reports on damage to the 1956 needles were received during January and February of 1957 when the symptoms were obvious. Assuming that infection occurred from July onwards the fungus had time to colonise most of the needle tissue and the damage was too advanced for eradication.

This explains why no advice on control measures could be given to the numerous enquiries which we had this winter. Nothing could be done to help the 1956 needles. The important thing was what would happen to those of 1957. As is already apparent, weather conditions this season are notably different from those of 1956 which was characterised by its cold, wet summer - conditions traditionally favouring Lophodermium. So far, the indications are that the fungus will not be serious this season if no prolonged breakdown in the weather occurs in July. This comparison of the two years well exemplifies the variation in damage caused by Lophodermium. It also shows that until we have shown the effectiveness of an eradicant fungicide, no control measures against Lophodermium can be advised.

NEOMYZAPHIS ABIETINA WALKER.

Perhaps one of the most noticeably active forest pests this year has been the Green Spruce Aphis. Judging by reports and enquiries severe attacks have been experienced throughout the country, and, as is always the case when high populations of this insect build up, some alarm has been caused. In the absence of any publication on the subject it is appropriate at this moment to tell what we know.

Neomyzaphis belongs to the group of aphids which, though migratory in habit, have apparently lost their secondary hosts. They are easy to spot in the field as they are the only totally green aphids commonly found on spruce, and their characteristically pink eyes will clinch the identification. The life cycle is briefly as follows; - Hibernation is as an adult or nymph on the leaves. As temperatures rise in the spring successive parthenogenetic (no males required) viviparous (no eggs - but born as a nymph) generations are produced, until, usually during the first two weeks of June, there is a winged generation. These latter fly away, and, in spite of a good deal of investigation, nobody knows where. In the laboratory, the winged individuals will produce young on healthy spruce, but in the field it is quite impossible to find them from mid-June until about October. Reproduction then starts again.

Feeding in spring is on older foliage but in autumn may be on current year's needles as well. Exceptionally, when numbers are

very high, spring feeding may be in the latter as well, and this year such activity has been noticed in several places. In general it is the spring generation which does the damage, the autumn ones having only a short time of suitable conditions before winter sets in.

As far as the factors affecting numbers are concerned, temperature seems to be of great importance. A mild autumn will produce a good overwintering population, but the success of the latter depends largely on winter temperatures. In a normal winter many aphids are killed by frost. Again conditions in spring are most important, prolonged mild temperatures encouraging good reproduction, development and feeding. We can say then that the last 7 or 8 months have been perfect for Neomyzaphis.

Recovery from attack is usually extremely good, and severe attacks seldom recur in successive years. Though this aphid often causes severe defoliation in a plantation, if other site factors are suitable to spruce growing, then some loss of increment will be the extent of the damage. Where, however, the trees are suffering from lack of water, whether due to lack of rainfall, excessive drainage, or abnormally high transpiration rates induced by exposure, attack may be rather more serious in effect. On such sites it might well be advisable to reconsider the choice of species.

Greatest damage is undoubtedly caused to Sitka and other glaucous spruces. Norway seems to be able to withstand attack better but Omorika holds pride of place for resistance. Until this year the latter species was thought to be immune but there is quite considerable needle loss this year in Alice Holt nursery.

REMINDER!!!

Specimens and Descriptions to be sent direct to either the Pathologist or the Entomologist, the minute preferably being in the package with the material.

A copy of the minute and all subsequent correspondence to go via your Conservator.

Pathologist	:	FOREST RESEARCH STATION,
	:	ALICE HOLT LODGE,
Entomologist	:	WRECCLESHAM,
	:	FARNHAM, SURREY.